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Two New Dendrothripinae (Insecta: Thysanoptera: Thripidae) from Japan

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Two new dendrothripine Thripidae are described and illustrated from Japan. *Petrothrips nigriceps* gen. et sp. nov. is described from the Izu Peninsula, and *Dendrothrips amamiensis* sp. nov. from Amami I. in the Ryukyu Islands. The genus *Petrothrips* is closely related to *Edissa* Faure, 1953 and *Asprothrips* Crawford, 1938. *Dendrothrips amamiensis* is closely related to *D. sexmaculatus* Bagnall, 1916.

Key Words: Thysanoptera, Thripidae, Dendrothripinae, *Petrothrips*, *Dendrothrips*, Japan.

Introduction

Taxa having a greatly elongate, “lyre-shaped” metathoracic furca in the family Thripidae were long treated as the tribe Dendrothripini of the subfamily Thripinae, following Priesner (1925); since Bhatti (1989), however, they have been recognized as the subfamily Dendrothripinae (see Mound 1997, 1999). Members of the subfamily Dendrothripinae are small-sized, leaf-inhabiting thrips that show jumping activity associated with large muscles arising from their hind legs and attaching to the enlarged metathoracic furca. Of the 86 species in 10 genera known worldwide, eight species in the following four genera have been hitherto known from Japan (Kudô 1984; Nonaka and Okajima 1991; Mound 1999): *Asprothrips* Crawford, 1938; *Dendrothrips* Uzel, 1895; *Pseudodendrothrips* Schmutz, 1913; and *Edissa* Faure, 1953.

Recently the present authors found two undescribed dendrothripine species from Japan, one from grasses on the Izu Peninsula in Honshu, and the other from leaves of *Stylax* sp. and *Macaranga tararius* (L.) at Amami I. in the Ryukyu Islands. The new species from the Izu Peninsula appears to belong to a new genus that is closely related to species of *Edissa* and *Asprothrips*, but distinguished by differences in antennal segmentation and shape, head shape, and pronotal sculpture. The species from Amami I. is a new species of *Dendrothrips*, and both new taxa are here described and illustrated.

Systematics

The members of the Dendrothripinae usually feed on dicotyledonous tree leaves (Mound 1997) such as those listed below, but the species of *Edissa* and the new genus *Petrothrips* appear to be associated with grasses. In Japan, previously, one species of *Asprothrips* has been known from Kyushu and Honshu, although its host plants are unknown; four species of *Dendrothrips* are known from Magnoliaceae, Oleaceae, Theaceae, etc. in Ishigaki Is., Kyushu, and Honshu; one species of *Eddisa* is known from grasses in the Ogasawara Is.; and two species of *Pseudodendrothrips* are known mainly from *Morus bombycis* Koiz. throughout Japan, although one of them, *P. bhatti* Kudo, 1984, was suggested to be a synonym of the other species, *P. mori* (Niwa, 1908), by Mound (1999).

Key to the Japanese genera of Dendrothripinae

1. Prosternal ferna undivided; B1 setae on abdominal terga minute and shorter than distance between them2
- Prosternal ferna divided; B1 setae on abdominal terga elongate and longer than distance between them4
2. Cheeks rounded; antennal segments III and IV with forked sense-cones; fore wing with two stout setae at apex*Asprothrips*
- Cheeks straight or slightly concave; antennal segments III and IV with simple sense-cones; fore wing without stout setae at apex3
3. Antennae eight-segmented, slender; pronotum sculptured with reticles on each side; tarsi two-segmented*Petrothrips* gen. nov.
- Antennae seven-segmented, short and thick; pronotum sculptured with transverse striae; tarsi one-segmented*Edissa*
4. Fore wing down-turned at costal margin, without conspicuous elongate setae at apex; anterior fringe hairs arising from ventral surface and far from anterior margin*Dendrothrips*
- Fore wing not down-turned at costal margin, with one elongate seta at apex; anterior fringe hairs arising from anterior margin*Pseudodendrothrips*

Petrothrips gen. nov.

(Figs 1–9)

Type species. *Petrothrips nigriceps* sp. nov.

Description. *Macropterous*. Head (Fig. 2) slightly broader than long and slightly longer than pronotum; vertex slightly depressed in front of anterior ocellus; cheeks straight or slightly concave; ventral surface of head with stout seta anteriomesad of each compound eye (Fig 4). Ocellar setae pair I absent and pairs II and III minute. Postocular setae arranged in four pairs. Antennae (Fig. 1) eight-segmented, slender and long; segments III and IV with simple sense cones. Maxillary palps very short, three-segmented.

Pronotum (Fig. 2) slightly broader than long, without elongate setae, weakly sculptured with irregular reticles on each side; discal setae minute and subequal in length to anterior and posterior marginal setae; ferna (Fig. 6) undivided, very

narrow in middle; propinasternum (Fig. 6) well developed. Mesonotum (Fig. 3) with pair of campaniform sensilla near anterior margin; mesothoracic sternopleural sutures absent. Metascutum (Fig. 3) with pair of campaniform sensilla; metasternal furca extending into mesothorax (Fig. 6).

Spinula present on meso- and metasternum (Fig. 6). Fore wings (Fig. 5) uniformly covered with microtrichia and with very small veinal setae, without stout setae but with one fringe hair at apex; costal margin not down-turned; anterior fringe hairs arising from ventral side near costal margin; posterior fringe hairs slightly wavy; scale with four veinal setae and one discal seta. Tarsi two-segmented; hind tarsi not elongate.

Abdominal terga I to VIII (Fig. 8a, b) each with B1 setae minute and shorter than distance between them; tergum IX much longer than tergum X, with B1 to B3 setae stout and shorter than tergum X (Fig. 9); tergum X divided in distal half, with pair of campaniform sensilla (Fig. 9); sterna without discal setae. Ovipositor well developed.

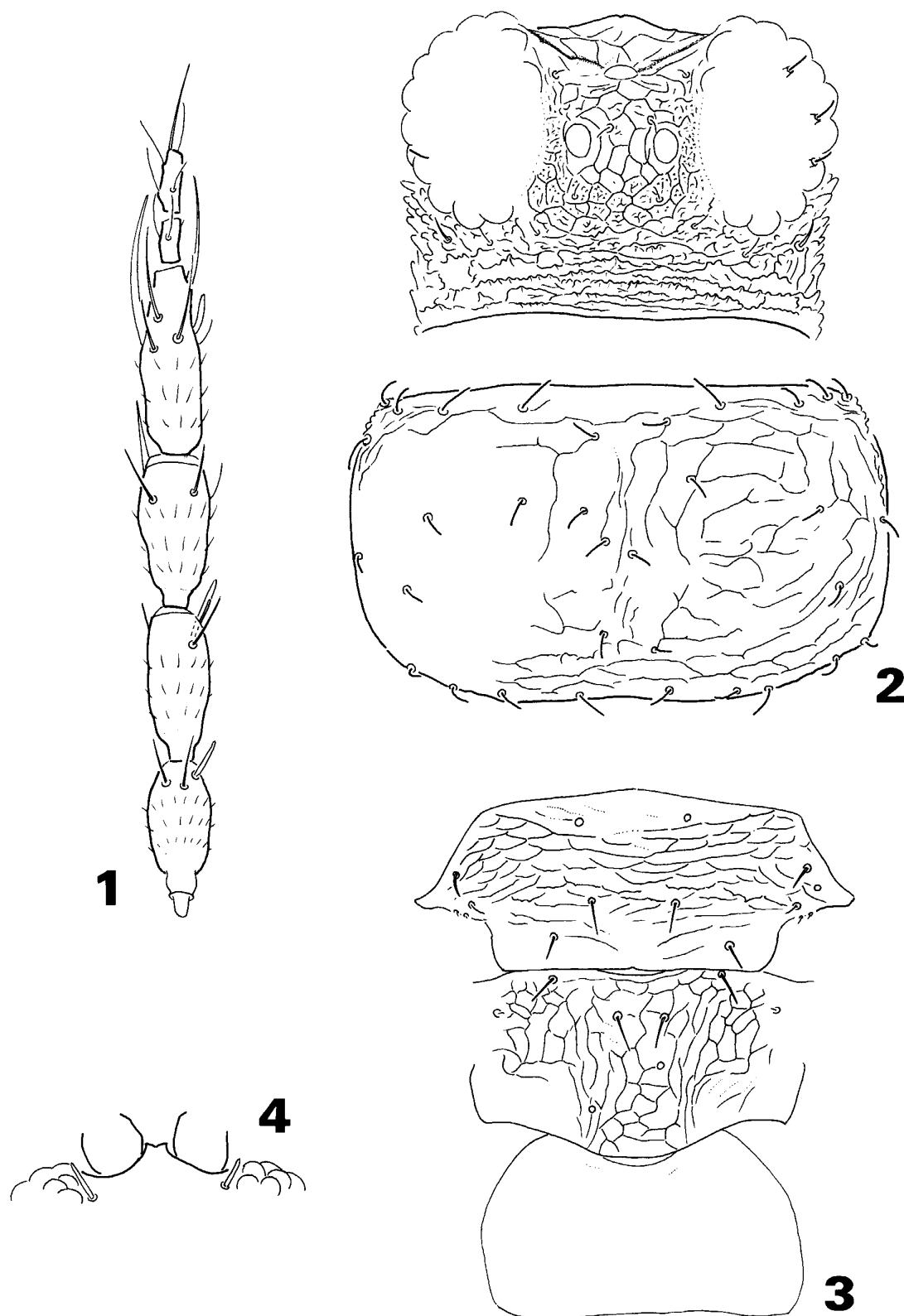
Remarks. This new genus is similar to the genera *Edissa* and *Asprothrips* in having short B1 setae on the abdominal terga, undivided prosternal ferna, and three-segmented maxirally palps, but it can be distinguished from the latter two genera by features mentioned in the above key. According to Bhatti (1970), the Indian genus *Parsiouthrips* Bhatti, 1970 also shares these characters with these three genera; however, it is separable from them by the down-turned costal margin and the straight posterior fringe hairs of the fore wings as in *Dendrothrips*.

Etymology. Derived from the Latin *petra*, stone, in reference to the reticulated body surface like a stone wall, and *thrips*, thripids; gender masculine.

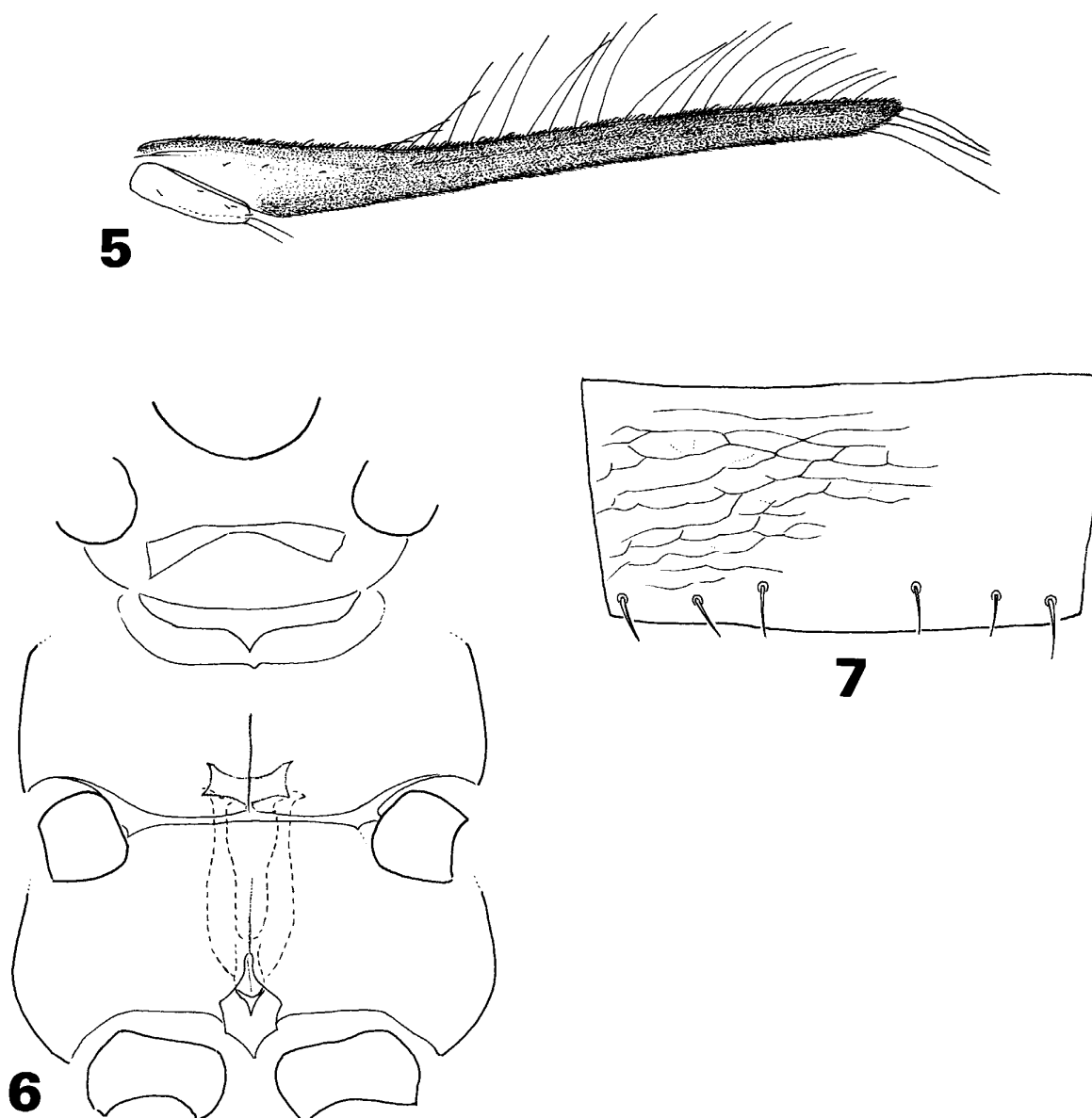
***Petrothrips nigriceps* sp. nov.**
(Figs 1–9)

Description. *Female.* Distended body length 1.3–1.4 mm. Body bicoloured; head dark brown with cheeks slightly paler; thorax and abdomen uniformly yellow; antennal segment I brown, segment II yellowish brown with extreme base brown, segments III to V yellow, segment VI brown with basal third slightly paler, and segments VII to VIII brown; legs yellow; fore wings brown with base behind first vein and scale clear; prominent body setae nearly yellow, but often slightly shaded.

Head (Fig. 2) 1.2–1.3 times as broad as long (holotype: 1.2 times); dorsal surface distinctly sculptured with anastomosing tuberculate striae in basal third and with polygonal reticulation between compound eyes, bearing wrinkles between striae and within reticles except in front of anterior ocellus and within ocellar triangle. Dorsal length of compound eyes 0.6–0.7 times head length (holotype: 0.7 times). Distance between posterior ocelli and posterior margin of head 3.0–3.8 times as long as distance separating posterior ocelli (holotype: 3.4 times). Ocellar setae pair III situated within ocellar triangle. Antennal segment I not enlarged; segment II normally barrel-shaped, with very sparse, small microtrichia on three to four rows of sculpture, a campaniform sensillum, and a subbasal seta; segments III to VI each with two to four rows of microtrichia on both dorsal and ventral surfaces; segment VI longest, its inner sense-cone reaching to mid length of segment VII (Fig. 1).



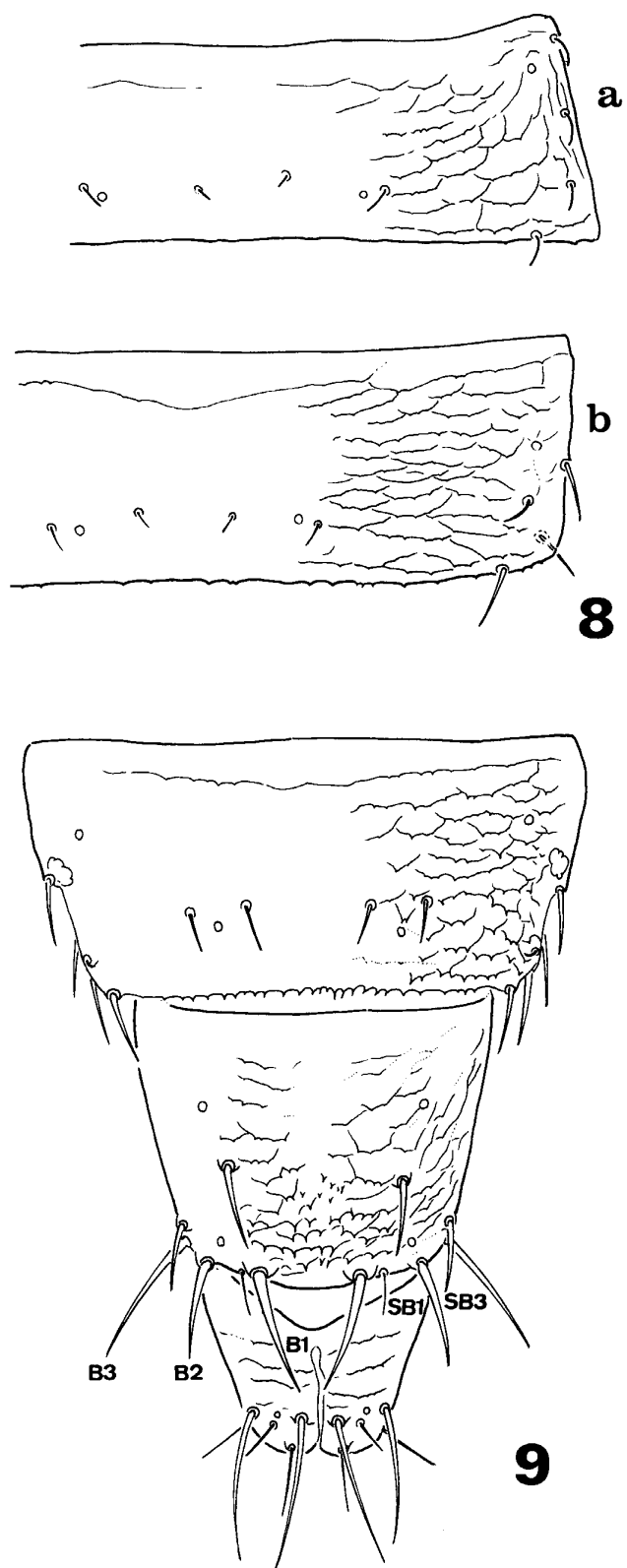
Figs 1-4. *Petrothrips nigriceps* gen. et sp. nov., female. 1, segments III to VIII of right antenna (dorsal aspect); 2, head and pronotum; 3, meso- and metanotum; 4, anterior part of head, ventral.



Figs 5–7. *Petrothrips nigriceps* gen. et sp. nov., female. 5, right fore wing (posterior fringe hairs omitted except in distal part); 6, thoracic sternum; 7, abdominal sternum VII.

Length/width of antennal segments I to VIII (holotype) 0.7–1.0 (1.0), 1.2–1.3 (1.3), 2.5–2.7 (2.6), 2.2–2.6 (2.4), 2.1–2.3 (2.2), 3.0–3.1 (3.2), 1.5–1.8 (1.8), and 3.5–4.7 (3.6), respectively.

Pronotum (Fig. 3) 1.6–1.7 times as broad as long (holotype: 1.7 times), with 14–19 discal setae (holotype: 19 setae), smooth within reticles; anterior margin usually with eight setae; posterior margin with 10 setae. Mesonotum (Fig. 3) sculptured with anastomosing striae bearing small tubercles, smooth within reticles, with pair of median setae in posterior fourth. Metascutum (Fig. 3) smooth within reticles, sculptured with longitudinal reticulations medially; pair of median setae situated far from anterior margin. Fore wings (Fig. 5) with 20–25 setae on costal vein (holotype: left wing 20, right wing 22), four to six basal and two distal setae on first vein, and five setae on second vein.



Figs 8-9. *Petrothrips nigriceps* gen. et sp. nov., female. 8, part of abdominal terga (a, segment II; b, segment V); 9, abdominal terga VII to X.

Abdominal terga I to VIII (Fig. 8a, b) sculptured on either side with anastomosing striae bearing small tubercles, smooth between striae; terga III to VII with scattered small posteromarginal combs and six pairs of setae; tergum II with six pairs of setae including three pairs on lateral margins arranged in row on each side, and with sparse, small, dentate microtrichia along lateral parts of posterior margin; tergum VIII (Fig. 9) with more prominent dentate microtrichia in middle, and with seven pairs of setae; tergum IX (Fig. 9) 1.8–2.0 times as long as tergum X (holotype: 2.0 times), with two pairs of campaniform sensilla and sculptured with transverse anastomosing striae bearing dentate microtrichia; SB2 setae of tergum IX absent below pair of mid-dorsal setae, B1 setae slightly longer than B2 setae and about 0.5 times as long as tergum IX, and B3 setae slightly more slender and longest; tergum X sculptured with transverse striae bearing small tubercles; posteromarginal setae of sternum VII (Fig. 7) situated ahead of posterior margin. Ovipositor 1.6–1.8 times as long as median length of pronotum (holotype: 1.8 times).

Male. Unknown.

Measurements (in μm). *Holotype* (female). Distended body length 1,315. Head length 116, width across cheeks 144; compound eye dorsal length 76, width 46; distance between posterior ocelli 18; distance between posterior ocelli and posterior margin of head 61. Pronotum length 106, width 177; metascutal length 63. Fore wing length 658. Abdominal tergum IX length 89; B1, B2, and B3 setae lengths 48, 33, and 57, respectively; tergum X length 45. Ovipositor length 192. Length (width) of antennal segments I to VIII 23 (24), 37 (29), 41 (16), 38 (16), 41 (19), 51 (16), 11 (6), and 18 (5), respectively.

Type series. Holotype (female) and two female paratypes: Japan, Honshu, Shizuoka Pref., Izu Peninsula, near Kawazu, Mt. Kan'on-yama, on grass, 26–vi–1987, S. Okajima. These types are deposited in Laboratory of Insect Resources, Faculty of Agriculture, Tokyo University of Agriculture, Atsugi, Kanagawa Pref., Japan.

Remarks. This species is very similar to the members of *Edissa*, but it can be distinguished from the latter by having two-segmented tarsi and eight-segmented, slender antennae.

Etymology. In reference to the black head of the species.

Dendrothrips Uzel, 1895

Previously, only one of these species, *D. latimaculatus*, has been known from the subtropical region collected from the leaves of *Fraxinus* (Oleaceae) at Ishigaki Is. The other three species are known from *Fraxinus sieboldiana* Blume (Oleaceae), *Magnolia kobus* DC. (Magnoliaceae), *Quercus serrata* Thunb. ex Murray (Fagaceae), *Sambucus sieboldiana* Blume ex Graedn. (Caprifoliaceae) and *Thea sinensis* L. (Theaceae) in Kyushu and Honshu in the temperate zone (Kudô 1984).

Key to the Japanese species of *Dendrothrips*

1. Fore wing uniformly covered with microtrichia.....2
- Fore wing not uniformly covered with microtrichia4
2. Antennal segments III and IV with simple sense-cones; fore wing grayish brown,

- but with white cross band in second quarter*D. minowai* Priesner, 1925
- Antennal segments III and IV with forked sense-cones; fore wing differently coloured.....3
3. Antennal segment VI cylindrical but tapering in distal third; fore wing dark brown with basal one-fifth pale; abdominal terga V to VII without large doughnut-like, pale areas.....*D. amamiensis* sp. nov.
- Antennal segment VI constricted at base, widest near base and gradually narrowing forward to apex; fore wing dark brown with three small pale areas (one beyond middle, and two in proximal third); abdominal terga V to VII usually with two large, doughnut-like, pale areas.....*D. magnoliae* Kudô, 1984
4. Antennal segments III to VI with rows of microtrichia; segment II with subbasal seta on dorsal surface*D. latimaculatus* Nonaka and Okajima, 1991
- Antennal segments III to VI without rows of microtrichia; segment II without subbasal seta on dorsal surface.....*D. utari* Kudô, 1984

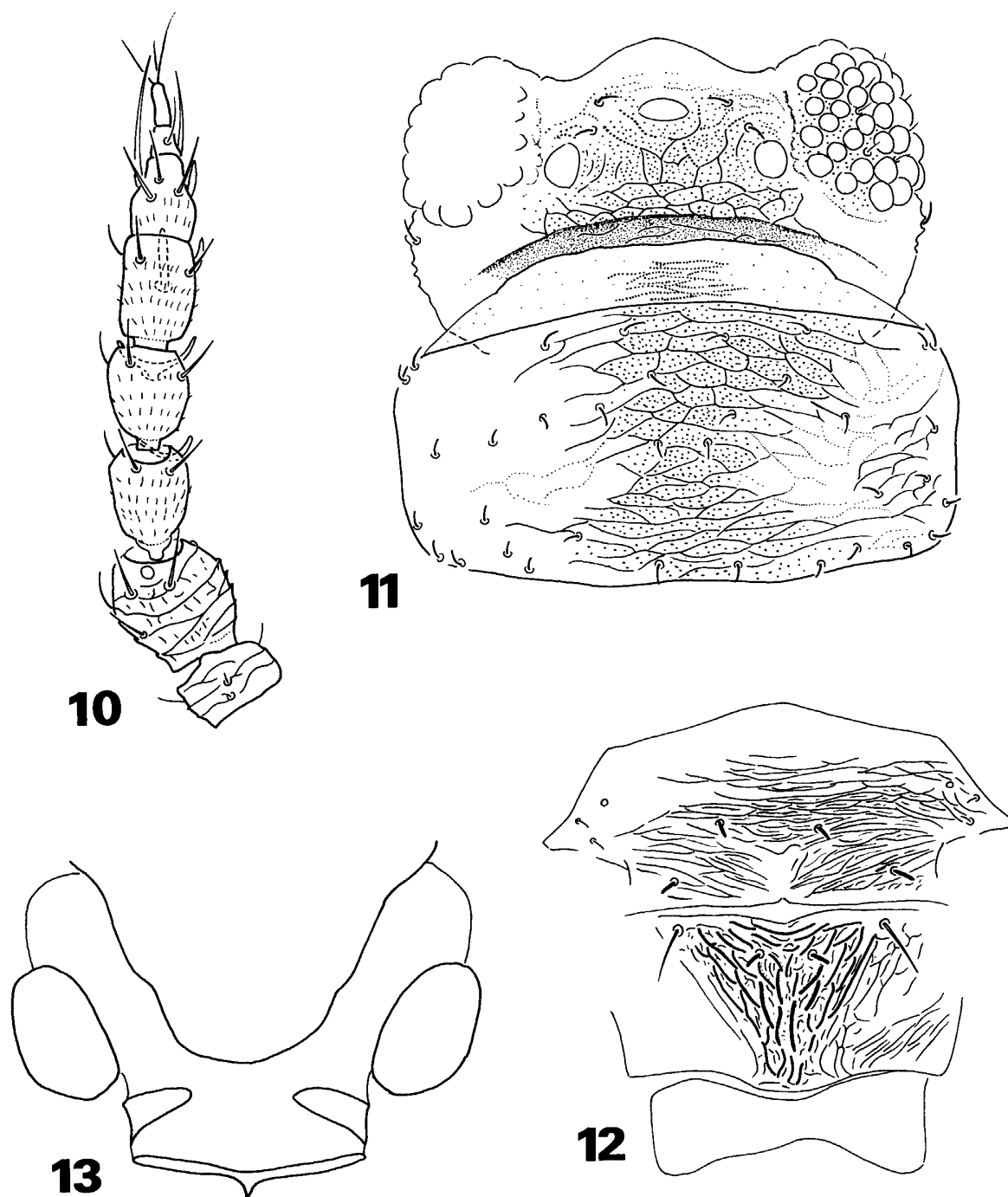
***Dendrothrips amamiensis* sp. nov.**

(Figs 10–15)

Description. *Female.* Distended body length about 0.9 mm. Colour uniformly brown to dark brown, but middle of abdominal terga III to VII and X, and posterior half of middle of tergum IX, pale brown; antennal segments I and VI to VIII brown, with segment I slightly paler, segment II dark brown, segments III to V slightly shaded, and segment III slightly darker than segment IV; all femora and tibiae dark brown; all tarsi yellowish brown; fore wings dark brown with basal one-fifth pale, with scale pale shaded at extreme base; prominent body setae shaded.

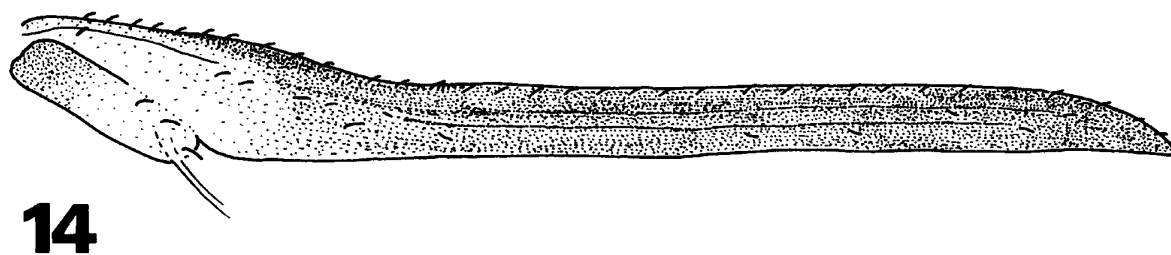
Head (Fig. 11) 1.9–2.0 times as wide as long (holotype: 1.9 times); dorsal surface distinctly reticulated posteromedially and granulated throughout; cheeks slightly rounded. Dorsal length of compound eyes about 0.7 times head length. Distance between posterior ocelli and posterior margin of head 0.4–0.5 times as long as distance between posterior ocelli (holotype: 0.4 times). Ocellar seta pair I absent, pairs II and III minute, and pair III situated in front of posterior ocelli. Antennae (Fig. 10) eight-segmented: segments III and IV with forked sense-cones on outer and ventral surfaces, respectively; segment II enlarged, with wrinkles and subbasal seta on dorsal surface; segment V cylindrical; segment VI not constricted at base and tapering in distal half, its inner sense-cone exceeding apex of segment VIII; segments III to V pedicellate; segments III to VI each with two to five rows of microtrichia on dorsal and ventral surfaces. Length/width of antennal segments I to VIII (holotype): 0.8–0.9 (0.9), 1.0–1.1 (1.1), 1.4–1.8 (1.8), 1.2–1.7 (1.3), 1.4–1.8 (1.8), 1.5–1.9 (1.4), 1.1–1.8 (1.6), and 2.0–3.7 (3.7), respectively. Maxillary palp two-segmented.

Pronotum (Fig. 11) 1.9–2.2 times as wide as long (holotype: 2.0 times), distinctly reticulated and bearing numerous granules throughout, without elongate setae, shallowly concave at each side near posterior margin, with 23–28 discal setae (holotype: 28); posterior margin with 10 setae; ferna (Fig. 13) divided; prospinasternum (Fig. 13) distinct. Mesonotum (Fig. 12) sculptured with transverse anastomosing striae, without campaniform sensilla; surface wrinkle between striae; pair of median setae situated medially. Metascutum (Fig. 12) without campaniform sensilla, sculptured with longitudinal anastomosing striae, with numerous wrinkles be-

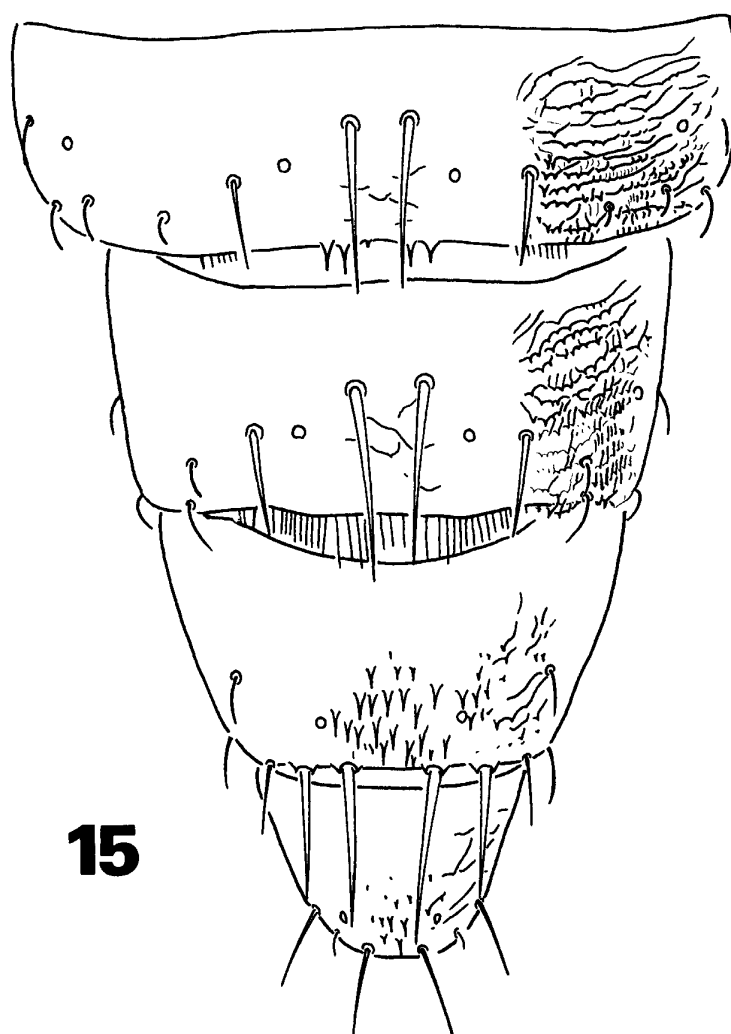


Figs 10–13. *Dendrothrips amamiensis* sp. nov., female. 10, right antenna, dorsal; 11, head and pronotum; 12, meso- and metanotum; 13, prosternum.

tween striae at median triangular area; pair of minute median setae situated far from anterior margin; pair of outer setae longer and finer than median setae. Fore wings (Fig. 14) uniformly covered with microtrichia, with costal margin downturned; 30–35 minute setae present on costal vein (holotype: left wing 33, right wing 35); four to seven basal and two distal setae on first vein, and five to seven (holotype: six) setae on second vein; scale with three to four (holotype: three) veinal



14



15

Figs 14–15. *Dendrothrips amamiensis* sp. nov., female. 14, right fore wing (fringe hairs omitted); 15, abdominal terga VII to X.

setae and one discal seta. Tarsi one-segmented.

Abdominal terga II to VIII (Fig. 15) sculptured on each side, with transverse anastomosing striae bearing tubercles, and with granules or wrinkles within reticulations, almost smooth but weakly reticulated behind B1 setae, with seven pairs of setae (nine pairs on tergum II); terga III to VII with microtrichia along posterior margin behind B1 and B2 setae; tergum VIII with posteromarginal comb complete; terga IX and X with some rows of microtrichia; tergum IX (Fig. 15) 1.1–1.4 times as long as tergum X (holotype: 1.3 times), with B1 setae slightly longer than B2 setae and 0.6–0.8 times as long as tergum IX (holotype: 0.8 times) and with middorsal setae minute and situated in posterior third; tergum X (Fig. 15) not divided, with pair of campaniform sensilla; posteromarginal setae on sternum VII situated near posterior margin. Ovipositor 1.9–2.0 times as long as pronotal median length (holotype: 1.9 times).

Male. Unknown.

Measurements (in μm). *Holotype* (female). Body length 941. Head length 84, width across cheeks 163; compound eye dorsal length 61, width 38; distance between posterior ocelli 58; distance between posterior ocelli and posterior margin of head 21; antennal length 166. Pronotum length 88, width 176. Fore wing length 659. Abdominal tergum IX length 62; B1 and B2 setae lengths 50 and 38, respectively; tergum X length 48. Ovipositor length 166. Length (width) of antennal segments I to VIII: 18 (21), 29 (27), 28 (16), 24 (18), 29 (16), 20 (14), 8 (5), and 11 (3), respectively.

Type series. *Holotype* (female): Japan, Kagoshima Pref., Amami I., Kinsakubaru, on leaves of *Stylax* sp. (Stylacaceae), 30–vi–2000, M. Masumoto. *Paratypes*: seven females collected from leaves of *Macaranga tanaius* (L.) (Euphorbiaceae) at same time as collection of holotype; eight females on leaves of *M. tanaius* at same site, 1–vii–2000, M. Masumoto. These types are deposited in Insect Systematics Laboratory, Natural Resources Inventory Center, National Institute for Agro-Environmental Sciences, Tsukuba, Japan.

Remarks. According to the keys provided by zur Strassen (1968) and Bhatti (1971), and to the redescription and illustrations of Faure (1960), this species resembles *Dendrothrips sexmaculatus* Bagnall, 1916 from South Africa and India in having microtrichia uniformly covering the fore wings and forked sense-cones on the third and fourth antennal segments; however, in *D. sexmaculatus* the fore wings are shaded at extreme base and distal three-fourths to four-fifths and clear in other parts, and terga IV to VI are each whitish yellow with a pair of brown spots. In the species described here the contrasting character states are: fore wings uniformly brown except for clear area in basal fifth, and abdominal terga almost uniformly brown to dark brown except for a slightly pale area in the middle. This species is similar in antennal shape and the sculpture of the abdominal terga to *D. latimaculatus*, but in that species the fore wings are not uniformly covered with microtrichia.

Etymology. The specific name is derived from Amami Island, the type locality of the species.

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